

10/518001 *14*

## SEQUENCE LISTING

&lt;110&gt; EBL GmbH

&lt;120&gt; Method for the production of protamine

&lt;130&gt; Protamine

&lt;140&gt;

&lt;141&gt;

&lt;160&gt; 36

&lt;170&gt; PatentIn Ver. 2.1

&lt;210&gt; 1

&lt;211&gt; 102

&lt;212&gt; DNA

&lt;213&gt; Oncorhynchus mykiss

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1) .. (99)

&lt;220&gt;

<223> aa sequence derived from ORF of nucleotide  
sequence

&lt;400&gt; 1

atg	ccc	aga	aga	cgc	aga	tcc	tcc	agc	cga	cct	gtc	cgc	agg	cgc	cgc	48
Met	Pro	Arg	Arg	Arg	Arg	Ser	Ser	Ser	Arg	Pro	Val	Arg	Arg	Arg	Arg	
1				5				10				15				

cgc	ccc	agg	gtg	tcc	cga	cgt	cgt	cgc	agg	aga	gga	ggc	cgc	agg	agg	96
Arg	Pro	Arg	Val	Ser	Arg	Arg	Arg	Arg	Arg	Arg	Gly	Gly	Arg	Arg	Arg	
			20				25					30				

cgt	tag															102
Arg																

&lt;210&gt; 2

&lt;211&gt; 33

&lt;212&gt; PRT

&lt;213&gt; Oncorhynchus mykiss

&lt;220&gt;

<223> aa sequence derived from ORF of nucleotide  
sequence

&lt;400&gt; 2

Met	Pro	Arg	Arg	Arg	Arg	Ser	Ser	Ser	Arg	Pro	Val	Arg	Arg	Arg	Arg	
1				5				10					15			

Arg	Pro	Arg	Val	Ser	Arg	Arg	Arg	Arg	Arg	Arg	Gly	Gly	Arg	Arg	Arg	
			20				25					30				

Arg

&lt;210&gt; 3

<211> 102  
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<213> Oncorhynchus mykiss

<220>  
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<222> (1)..(99)

<220>  
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sequence

<400> 3  
atg ccc aga aga cgc aga tcc tcc aga cca cct gtc cgc agg cgc cgc 48  
Met Pro Arg Arg Arg Arg Ser Ser Arg Pro Pro Val Arg Arg Arg  
1 5 10 15  
  
cgc ccc agg gtg tcc cga cgt cgt cgc agg aga gga ggc cgc agg agg 96  
Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg  
20 25 30  
  
cgt tag 102  
Arg

<210> 4  
<211> 33  
<212> PRT  
<213> Oncorhynchus mykiss

<220>  
<223> aa sequence derived from ORF of nucleotide  
sequence

<400> 4  
Met Pro Arg Arg Arg Arg Ser Ser Arg Pro Pro Val Arg Arg Arg Arg  
1 5 10 15  
  
Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg  
20 25 30  
  
Arg

<210> 5  
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<213> Oncorhynchus mykiss

<220>  
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<220>  
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sequence

<400> 5  
atg ccc aga aga cgc aga tcc tcc aga cga cct gtc cgc agg cgc cgc 48  
Met Pro Arg Arg Arg Arg Ser Ser Arg Arg Pro Val Arg Arg Arg Arg  
1 5 10 15

cgc ccc agg gtg tcc cga cgt cgt cgc agg aga gga ggc cgc agg agg 96  
 Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg  
                   20                  25                  30

cgt tag 102  
 Arg

<210> 6  
 <211> 33  
 <212> PRT  
 <213> Oncorhynchus mykiss

<220>  
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 sequence

<400> 6  
 Met Pro Arg Arg Arg Arg Ser Ser Arg Arg Pro Val Arg Arg Arg Arg  
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                   20                  25                  30

Arg

<210> 7  
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<220>  
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 <222> (1) .. (99)

<220>  
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<400> 7  
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 Met Pro Arg Arg Arg Arg Ser Ser Ser Arg Pro Val Arg Arg Arg Arg  
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cgc gcc agg gtg tcc cga cgt cgt cgc agg aga gga cgc cgc agg agg 96  
 Arg Ala Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Arg Arg Arg Arg  
                   20                  25                  30

cgt tag 102  
 Arg

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 <213> Oncorhynchus mykiss

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sequence

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1 5 10 15

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Arg

<210> 9

<211> 102

<212> DNA

<213> Oncorhynchus mykiss

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<222> (1)..(99)

<220>

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sequence

<400> 9

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Met Pro Arg Arg Arg Arg Ser Ser Ser Arg Pro Val Arg Arg Arg Arg  
1 5 10 15

cgc ccc agg gtg tcc cga cgt cgt cgc agg aga gga cgc cgc agg agg 96  
Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Arg Gly Arg Arg Arg Arg  
20 25 30

cgt tag 102  
Arg

<210> 10

<211> 33

<212> PRT

<213> Oncorhynchus mykiss

<220>

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sequence

<400> 10

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1 5 10 15

Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Arg Arg Arg Arg  
20 25 30

Arg

<210> 11

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<212> DNA  
<213> Oncorhynchus keta

<220>  
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<220>  
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sequence

<400> 11  
atg ccc aga aga cgc aga tcc tcc agc cga cct gtc cgc agg cgc cgc 48  
Met Pro Arg Arg Arg Ser Ser Ser Arg Pro Val Arg Arg Arg Arg  
1 5 10 15  
  
cgc cct agg gtg tcc cga cgt cgt cgc agg aga gga ggc cgc agg agg 96  
Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg  
20 25 30  
  
cgt tag 102  
Arg

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<211> 33  
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<213> Oncorhynchus keta

<220>  
<223> aa sequence derived from ORF of nucleotide  
sequence

<400> 12  
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Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg  
20 25 30  
  
Arg

<210> 13  
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<212> DNA  
<213> Oncorhynchus mykiss

<220>  
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<222> (1)..(99)

<220>  
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<222> (54)..(54)  
<223> n = a or c or g or t

<220>  
<223> nucleotide sequence derived from amino acid  
sequence

<400> 13  
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 Met Pro Arg Arg Arg Arg Ser Ser Ser Arg Pro Val Arg Arg Arg  
   1                  5                  10                  15  
 cgc gcn agg gtg tcc cga cgt cgt cgc agg aga gga ggc cgc agg agg 96  
 Arg Ala Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg  
                   20                  25                  30  
 cgt tag 102  
 Arg

<210> 14  
 <211> 33  
 <212> PRT  
 <213> Oncorhynchus mykiss

<220>  
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           sequence

<400> 14  
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                   20                  25                  30  
 Arg

<210> 15  
 <211> 96  
 <212> DNA  
 <213> Oncorhynchus mykiss

<220>  
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 <223> n = a or c or g or t

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           sequence

<400> 15  
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 Met Pro Arg Arg Arg Arg Ala Ser Arg Arg Val Arg Arg Arg Arg  
   1                  5                  10                  15  
 ccc agg gtg tcc cga cgt cgc agg aga gga ggc cgc agg agg cgt tag 96

Pro Arg Val Ser Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg Arg  
20 25 30

<210> 16  
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<212> PRT  
<213> Oncorhynchus mykiss

<220>  
<223> nucleotide sequence derived from amino acid  
sequence

<400> 16  
Met Pro Arg Arg Arg Arg Ala Ser Arg Arg Val Arg Arg Arg Arg Arg  
1 5 10 15

Pro Arg Val Ser Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg Arg  
20 25 30

<210> 17  
<211> 96  
<212> DNA  
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<222> 21  
<223> n = a or g or c or t

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<223> n = a or g or c or t

<220>  
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sequence

<400> 17  
atg ccc aga aga cgc aga gcn agc cga cgn ath cgc agg cgc cgc cgc 48  
Met Pro Arg Arg Arg Arg Ala Ser Arg Arg Ile Arg Arg Arg Arg Arg  
1 5 10 15

ccc agg gtg tcc cga cgt cgc agg aga gga ggc cgc agg agg cgt tag 96  
Pro Arg Val Ser Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg Arg  
20 25 30

<210> 18  
<211> 31  
<212> PRT  
<213> Oncorhynchus mykiss

<220>  
<223> nucleotide sequence derived from amino acid  
sequence

<400> 18

Met Pro Arg Arg Arg Arg Ala Ser Arg Arg Ile Arg Arg Arg Arg Arg  
1 5 10 15

Pro Arg Val Ser Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg Arg  
20 25 30

<210> 19

<211> 102

<212> DNA

<213> Oncorhynchus mykiss

<220>

<221> CDS

<222> (1)..(99)

<220>

<223> nucleotide sequence derived from amino acid  
sequence

<400> 19

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Met Pro Arg Arg Arg Arg Arg Ser Ser Ser Arg Pro Ile Arg Arg Arg  
1 5 10 15

cgc cgc ccc agg gtg tcc cga cgt cgc agg aga gga ggc cgc agg agg 96  
Arg Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg  
20 25 30

cgt tag 102  
Arg

<210> 20

<211> 33

<212> PRT

<213> Oncorhynchus mykiss

<220>

<223> nucleotide sequence derived from amino acid  
sequence

<400> 20

Met Pro Arg Arg Arg Arg Arg Ser Ser Ser Arg Pro Ile Arg Arg Arg  
1 5 10 15

Arg Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg  
20 25 30

Arg

<210> 21

<211> 96

<212> DNA

<213> Clupea harengus

<220>



<221> CDS  
<222> (1)..(93)

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<223> n = a or g or c or t

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sequence

<400> 21  
atg ccc aga aga cgc acc aga cgc gcn agc cga cct gtc cgc agg cgc 48  
Met Pro Arg Arg Arg Thr Arg Arg Ala Ser Arg Pro Val Arg Arg Arg  
1 5 10 15  
  
cgc ccc agg cgc gtg tcc cga cgt cgt cgc gca cgc cgc agg agg tag 96  
Arg Pro Arg Arg Val Ser Arg Arg Arg Arg Ala Arg Arg Arg Arg  
20 25 30

<210> 22  
<211> 31  
<212> PRT  
<213> Clupea harengus

<220>  
<223> nucleotide sequence derived from amino acid  
sequence

<400> 22  
Met Pro Arg Arg Arg Thr Arg Arg Ala Ser Arg Pro Val Arg Arg Arg  
1 5 10 15  
  
Arg Pro Arg Arg Val Ser Arg Arg Arg Arg Ala Arg Arg Arg Arg  
20 25 30

<210> 23  
<211> 99  
<212> DNA  
<213> Clupea harengus

<220>  
<221> CDS  
<222> (1)..(96)

<220>  
<221> misc\_feature  
<222> 30  
<223> n = a or g or c or t

<220>  
<223> nucleotide sequence derived from amino acid  
sequence

<400> 23  
atg gcc aga aga cgc aga agc aga cgc gcn agc cga cct gtc cgc agg 48  
Met Ala Arg Arg Arg Arg Ser Arg Arg Ala Ser Arg Pro Val Arg Arg  
1 5 10 15

cgc cgc ccc agg cgc gtg tcc cga cgt cgt cgc gca cgc cgc agg agg 96  
 Arg Arg Pro Arg Arg Val Ser Arg Arg Arg Arg Ala Arg Arg Arg Arg  
                   20                  25                  30

tag 99

<210> 24  
 <211> 32  
 <212> PRT  
 <213> Clupea harengus

<220>  
 <223> nucleotide sequence derived from amino acid  
           sequence

<400> 24  
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   1                  5                  10                  15  
 Arg Arg Pro Arg Arg Val Ser Arg Arg Arg Arg Ala Arg Arg Arg Arg  
                   20                  25                  30

<210> 25  
 <211> 99  
 <212> DNA  
 <213> Clupea harengus

<220>  
 <221> CDS  
 <222> (1)..(96)

<220>  
 <223> nucleotide sequence derived from amino acid  
           sequence

<400> 25  
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 Met Ala Arg Arg Arg Arg Ser Ser Ser Arg Pro Ile Arg Arg Arg Arg  
   1                  5                  10                  15

ccc agg cgc cgg acc aca cgt cgt cgc agg gca ggc cgc agg agg cgt 96  
 Pro Arg Arg Arg Thr Thr Arg Arg Arg Arg Ala Gly Arg Arg Arg Arg  
                   20                  25                  30

tag 99

<210> 26  
 <211> 32  
 <212> PRT  
 <213> Clupea harengus

<220>  
 <223> nucleotide sequence derived from amino acid  
           sequence

<400> 26  
 Met Ala Arg Arg Arg Arg Ser Ser Ser Arg Pro Ile Arg Arg Arg Arg  
   1                  5                  10                  15

Pro Arg Arg Arg Thr Thr Arg Arg Arg Arg Ala Gly Arg Arg Arg Arg  
20 25 30

<210> 27  
<211> 111  
<212> DNA  
<213> Artificial Sequence

<220>  
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<222> 30  
<223> n = a or g or c or t

<220>  
<223> Description of Artificial Sequence: consensus 1

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atgscagaa gacgcagaas cagaysckcn agmcsacstr thcgcaggcg ccgcccgcscy 60  
aggcgcskgw ccmsacgtcg tcgcaggaga gsasgccgca ggaggcgta g 111

<210> 28  
<211> 102  
<212> DNA  
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<223> n = a or g or c or t

<220>  
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<222> 12  
<223> n = a or g or c or t

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<222> 18  
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<220>  
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<220>  
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<220>  
<223> Description of Artificial Sequence: consensus 2

<400> 28  
atgccccgnc gncgccgntc ctccagccga cctgtccgcc gncgccgccg cccccgngtg 60  
tcccgaagtc gtcgccgncg nggaggccgc cgnccgctt ag 102

<210> 29  
<211> 102  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: consensus 3

<400> 29  
atgccgcggc gccgccggtc gtcgagccgc ccggtgcgtc gccggcgccg cccgcgggtc 60  
tcgcgcgcc gccggcgccg cggcgccgc cggcgccgct ga 102

<210> 30  
<211> 102  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: consensus 4

<400> 30  
atgccgcgcc gtcgccgtag ctccagccgt ccggtgcgtc gccgtgccg tccccgtgtc 60  
agccgcgcc gccgtgccg cggcgacgc cgtcgccgtt ga 102

<210> 31  
<211> 102  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: consensus 5

<400> 31  
atgccgcggc gtcggcgag ctccagccgt ccagtgcggc gccgtgccg cccccgtgtc 60  
tcgcgcgcc gccggcgccg cggcgacgc cgtcgccggt ga 102

<210> 32  
<211> 102  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: ebl 1

<400> 32

atgccgcggc gtcggcgtag ctccagccgt ccagtgcgtc gccgtcgccg cccccgtgtc 60  
tcgcgcgcgc gccggcgccg cggcggacgc cgtcgccgtt ga 102

<210> 33

<211> 36

<212> PRT

<213> Artificial Sequence

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<221> misc\_feature

<222> 1

<223> X= zero or M

<220>

<221> misc\_feature

<222> 2

<223> X= A or P

<220>

<221> misc\_feature

<222> 6

<223> X= zero or R

<220>

<221> misc\_feature

<222> 7

<223> X=zero or T or S

<220>

<221> misc\_feature

<222> 8

<223> X= zero or R

<220>

<221> misc\_feature

<222> 9

<223> X=zero or R or S

<220>

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<223> X= S or R

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<222> 12

<223> X= R or P

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<221> misc\_feature

<222> 13

<223> X= P or R

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<223> X= V or I

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<223> X= zero or R

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<223> X= zero or R

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<223> X= V or R

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<223> X= S or T

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<223> X= G or R

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<223> X= zero or R

<220>  
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sequence

<400> 33

Xaa Xaa Arg Arg Arg Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Arg Arg  
1 5 10 15

Arg Arg Xaa Xaa Arg Xaa Xaa Xaa Xaa Arg Arg Arg Xaa Xaa Xaa Xaa  
20 25 30

Arg Arg Arg Xaa  
35

<210> 34

<211> 227

<212> DNA

<213> Artificial Sequence

<220>

<221> CDS

<222> (43)..(108)

<220>

<221> CDS

<222> (109)..(207)

<220>

<223> Description of Artificial Sequence: cloning  
sequence for expression of Protamine

<220>

<221> sig\_peptide

<222> (43)..(108)

<223> pelB gene

<220>

<221> misc\_feature

<222> (1)..(6)

<223> XbaI restriction site

<220>

<221> misc\_feature

<222> (222)..(227)

<223> Bam HI restriction site

<220>

<221> RBS

<222> (28)..(33)

<223> IRES sequence

<220>

<221> gene

<222> (109)..(207)

<223> ebl 1 gene

<400> 34

tctagaaata attttgttta actttaagaa ggagatatat at atg aaa tac ctg 54  
Met Lys Tyr Leu  
1

ctg ccg acc gct gct gct ggt ctg ctg ctc ctc gct gcc cag ccg gcg 102  
Leu Pro Thr Ala Ala Gly Leu Leu Leu Ala Ala Gln Pro Ala  
5 10 15 20

atg gcc atg ccg cgg cgt cgg cgt agc tcc agc cgt cca gtg cgt cgc 150

Met Ala Met Pro Arg Arg Arg Arg Ser Ser Ser Arg Pro Val Arg Arg  
 25 30 35

cgt cgc cgc ccc cgt gtc tcg cgc cgc cgc cgg cgc cgc ggc gga cgc 198  
 Arg Arg Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Gly Arg  
 40 45 50

cgt cgc cgt tgaggaatta attcggatcc 227  
 Arg Arg Arg  
 55

<210> 35  
 <211> 22  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: cloning  
 sequence for expression of Protamine

<400> 35  
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 Ala Gln Pro Ala Met Ala  
 20

<210> 36  
 <211> 33  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: cloning  
 sequence for expression of Protamine

<400> 36  
 Met Pro Arg Arg Arg Arg Ser Ser Ser Arg Pro Val Arg Arg Arg Arg  
 1 5 10 15  
 Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg  
 20 25 30  
 Arg